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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/586,736	06/05/2000	Yezdi Dordi	4256	7891

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APPLIED MATERIALS, INC.  
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SANTA CLARA, CA 95050

EXAMINER

LEADER, WILLIAM T

ART UNIT	PAPER NUMBER
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1741

DATE MAILED: 01/14/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/586,736

Applicant(s)

DORDI, YEZDI

Examiner

William T. Leader

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2002 and 31 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8 and 18-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8 and 18-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8,9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Receipt of the response and IDS filed October 21, 2002, and the supplemental IDS filed on October 31, 2002, is acknowledged. Claims 3 and 4 have been canceled. New claims 27-29 have been added.

2. Independent claims 1 and 22 have been amended to recite that the anode segments are concentric. In view of this amendment, the rejections of record are withdrawn and the following rejection made.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 27-29 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 27 and 28 recite "a plurality of circular and non-concentric anode segments. The scope of this limitation is not clear. It appears that the wording may be taken as requiring circular anode segments which may or may not be

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concentric with respect to each other, and additionally one or more anode segments which are not concentric with the circular anode segments. Or it appears that the wording may be taken as requiring all circular anode segments which are non-concentric with respect to each other.

*Claim Rejections - 35 USC § 102*

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

1. Claims 1, 2, 7, 8, 18, 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (6,391,166).

Wang discloses apparatus for electrolytic metal deposition which includes a cathode and an anode assembly which is made of a plurality of anode segments.

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Figures 3A and 3B show an apparatus with concentric, circular anode segments 1, 2 and 3. The anode segments may have a substantially coplanar upper segment surfaces as recited in instant claim 2. Insulating walls are provided between the segments (column 18, lines 57-62). As shown in figure 3A, each one of the anode segments is closer to a distinct portion of the cathodic workpiece than the rest of the cathode as recited in instant claim 7. The anode segments are shown as being cylindrical as recited in instant claim 8. The anode segments have a substantially coplanar lower surfaces as recited in instant claim 18. Each anode segment is independently connected to power supplies 11, 12 and 13 (column 18, lines 33-34). Figures 9A-9D show cross section view of other embodiments of anode shapes and show that at least one of the segments may be rectangular as recited in instant claim 20.

2. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Reed (4,828,654) or Bhatt et al (5,156,730).

The Reed patent is directed to apparatus for electroplating which utilizes a segmented anode array. An electrical source is connected to each segment as shown in figure 1. Figure 3 of Reed shows that the anode segments are fastened by machine screws 38. Removal of the screws of one anode segment would allow that segment to be repositioned relative to the other anode segments.

The Bhatt et al patent is directed to apparatus for electroplating and uses a segmented anode array. Means are provided for electrically biasing each of the segments individually and for controlling the quantity of current to each segment individually (column 1, lines 50-53). Figure 2 shows that the anode segments are fastened by a hex nut and screw arrangement. Removal of the nuts and screws from one of the segments would allow it to be repositioned relative to the other anode segments.

*Claim Rejections - 35 USC § 103*

3. Claims 5, 19, 21, 22, 23, 25, 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Reed (4,828,654) and Bhatt et al (5,156,730).

4. Wang is taken as above. In figure 3A, Wang depicts the anode segments 1, 2 and 3 but does not show the details of the manner in which the segments are mounted. As noted above Wang discloses the placement of insulating walls between the anode segments and teaches the use of independent power supplies to provide independent control of the anode segments. This control would only be possible if the anode segments are mounted in which a way that they are insulated from each other. Wang additionally discloses the use of a computer to control the operation of the elements of the apparatus. See column 9, lines 24-28 and column 40, lines 39-41). This corresponds to the controller recited in instant claim 23.

5. As noted above, the Reed patent is directed to apparatus for electroplating which utilizes a segmented anode array. Reed teaches that supports 36 on which the anode segments are mounted is preferably formed of plastic to achieve an electrical insulating effect between the anode segments (column 4, lines 16-20).

These supports correspond to the insulating members of instant claim 5. This construction allows each anode segment to be individually electrically biased as recited in instant claim 19. Members 36 may be considered to be anode supports. Members 36 are mounted to flanges on housing 12 which may be considered to be an anode base as recited in instant claim 22. The anode segments are maintained in a fixed position relative to the base as recited in instant claim 25.

6. As stated above, the Bhatt et al patent is directed to apparatus for electroplating and uses a segmented anode array. Bhatt teaches that the anode segments are physically separated from each other by an electrical non-conductor (column 2, lines 61-62). Anode segments 1 are supported on an insulating rack 7 (column 3, lines 27-29). . These members correspond to the insulating members of instant claim 5. These members anode supports as in instant claim 22 and are mounted to the base of the housing which may be considered to be an anode base. The anode segments are maintained in a fixed position relative to the base as recited in instant claim 25.

7. It would have been obvious at the time the invention was made to have utilized the manner of mounting the anode segments on insulated anode supports

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mounted on an anode base as disclosed by Reed and Bhatt for the anode segments of Wang because the anode segments would have been securely mounted and electrically insulated from each other. Instant claim 23 recites that the cell of claim 22 further comprises a controller connected to the electrical source.

8. Claims 6 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of the Lowenheim text *Electroplating* combined with the admitted prior art and Reed.

9. Claim 6 recites that the anode segments are constructed from copper or a copper alloy. Lowenheim discloses that anode may be made from the metal to be deposited. Reed discloses that anode segments may be made from phosphorized copper (column 1, lines 41-45).

10. Claim 24 recites that the electrolytic cell further comprises a hydrophilic membrane. The admitted prior art is that found on pages 1-4 of the specification under the heading "Description of the Background Art" and shows that it is known to utilize soluble copper as anode material is known. The admitted prior art also shows that it is known to electroplate copper onto a semiconductor wafer and to surround the anode with a hydrophilic membrane to filter the anode sludge. Reed similarly discloses the use of a porous material separating the anode segments and the workpiece to filter anode fines (column 4, lines 56-59).



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11. It would have been obvious at the time the invention was made to have utilized anode segments constructed from copper in the apparatus of Wang because Lowenheim teaches that anodes made from the material to be deposited provide the metal ions to be plated, and the admitted prior art and Reed show that copper is a suitable material from which to make anodes. It would additionally been obvious to have utilized a membrane around the anode segments because anode fines and sludge would have been filtered as taught by the admitted prior art and Reed.

12. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Inoue et al (6,090,260).

13. Wang is taken as above. The Inoue et al patent is directed to a method and apparatus for electroplating. In addition to cathodic workpiece 14 and main anode 11, Inoue et al provide additional anodic electrode 15 powered by separate power supply 16. The additional electrode is not concentric with main anode 11. See figure 2. Electrode 15 is used during plating to provide additional current to the workpiece (column 4, lines 58-60). It would have been obvious at the time the invention was made to have included an additional anodic electrode as taught by Inoue et al in the apparatus of Wang because additional current would have been supplied to the workpiece. The apparatus would have included both a plurality of circular and non-concentric anode segments. As noted above in the 112 rejection,

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the wording of the limitations of claims 27-29 is not clear. The first interpretation is being applied to the claim language.

14. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Inoue et al as applied to claims 27 and 28 above, and further in view of Reed or Bhatt.

Claim 29 recites that at least one of the anode segments can be repositioned relative to the other anode segments. As indicated above, Reed teaches that the anode segments are fastened by machine screws 38. Removal of the screws of one anode segment would allow that segment to be repositioned relative to the other anode segments. The Bhatt et al patent is directed to apparatus for electroplating and uses a segmented anode array. Figure 2 shows that the anode segments are fastened by a hex nut and screw arrangement. Removal of the nuts and screws from one of the segments would allow it to be repositioned relative to the other anode segments. It would have been obvious at the time the invention was made to have mounted the anode segments of Wang with screws as shown by Reed and Bhatt because the segments would be capable of easily being interchanged. Use of screws would have allowed the screws of one segment to be removed and that segment repositioned with respect to the other segments.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William Leader, whose telephone number is (703) 308-2530. The examiner can normally be reached Mondays-Thursdays and every other Friday from 7:30 AM to 4:00 PM eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached at (703) 308-3322. The fax phone number for *official* after final faxes is (703) 872-9311. The fax phone number for all other *official* faxes is (703) 872-9310. Unofficial communications to the Examiner should be faxed to (703) 305-7719.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0661.

  
William Leader:wtl  
January 7, 2002



DONALD R. VALENTINE  
PRIMARY EXAMINER  
GROUP 1400 1742